

What is claimed is:

1. A magnetic head slider for flying above a magnetic disk, which comprises:
a leading edge;
an air bearing surface;
a trailing edge;
said air bearing surface having a front step bearing with submicron depth from said leading edge in continuity rearward, a rail surface made from this front step bearing in continuity rearward, a negative pressure recess more deep than said front step bearing made in continuity from said rail surface, and side step bearings with depth identical with said front step bearing made in continuity from the rail surface and said trailing edge made at opposite side of said leading edge; and wherein the ratio of depth R of said recess and depth δ_s of said front step bearing is $R / \delta_s > 5$.

2. A magnetic disk apparatus for a magnetic head slider flying on a magnetic disk in largest peripheral speed which determines from diameter of a magnetic disk and rotational head speed is 20m/s or less, which comprises:
the magnetic head slider;
the magnetic disk;
the spindle motor,
wherein the magnetic head slider having:

a leading edge;
an air bearing surface;
a trailing edge,
said air bearing surface having a front step bearing with
submicron depth from said leading edge in continuity rearward,
a rail surface made from this front step bearing in continuity
rearward, a negative pressure recess more deep than said front
step bearing made in continuity from said rail surface, and
side step bearings with depth identical with said front step
bearing made in continuity from the rail surface and said
trailing edge made at opposite side of said leading edge; and
wherein the ratio of depth R of said recess and depth δ_s of
said front step bearing is $R / \delta_s > 5$ and the depth δ_s of said
front step bearing is smaller than 200nm.

3. A magnetic disk apparatus for a magnetic head slider
flying on a magnetic disk in largest peripheral speed
determines from diameter of a magnetic disk and rotational
head speed is 20m/s or less, which comprises:

the magnetic head slider;

the magnetic disk;

the spindle motor,

wherein the magnetic head slider having:

a leading edge;

an air bearing surface;

a trailing edge,
said air bearing surface having a front step bearing with
submicron depth from said leading edge in continuity rearward,
a rail surface made from this front step bearing in continuity
rearward, a negative pressure recess more deep than said front
step bearing made in continuity from said rail surface, and
side step bearings with depth identical with said front step
bearing made in continuity from the rail surface and said
trailing edge made at opposite side of said leading edge; and
wherein the ratio of depth R of said recess and depth δ_s of
said front step bearing is $R / \delta_s > 5$, the depth δ_s of said
front step bearing is smaller than 200nm and the depth of said
recess is 1 μ m or less.

4. A magnetic disk apparatus for a magnetic head slider
flying on a magnetic disk in largest peripheral speed
determines from diameter of a magnetic disk and rotational
head speed is 60m/s or less, which comprises:

the magnetic head slider;

the magnetic disk;

the spindle motor,

wherein the magnetic head slider having:

a leading edge;

an air bearing surface;

a trailing edge,

said air bearing surface having a front step bearing with submicron depth from said leading edge in continuity rearward, a rail surface made from this front step bearing in continuity rearward, a negative pressure recess more deep than said front step bearing made in continuity from said rail surface, and side step bearings with depth identical with said front step bearing made in continuity from the rail surface and said trailing edge made at opposite side of said leading edge; and wherein the ratio of depth R of said recess and depth δ_s of said front step bearing and said side step bearing is $R / \delta_s > 5$, the depth δ_s of said front step bearing and said side step bearing is larger than 200nm, smaller than 400nm and the depth of said recess is 1 μ m or less.

5. A magnetic disk apparatus for a magnetic head slider flying on a magnetic disk in largest peripheral speed determines from diameter of a magnetic disk and rotational head speed is 60m/s or less, which comprises:

the magnetic head slider;

the magnetic disk;

the spindle motor,

wherein the magnetic head slider having:

a leading edge;

an air bearing surface;

a trailing edge,

said air bearing surface having a front step bearing with submicron depth from said leading edge in continuity rearward, a rail surface made from this front step bearing in continuity rearward, a negative pressure recess more deep than said front step bearing made in continuity from said rail surface, and side step bearings with depth identical with said front step bearing made in continuity from the rail surface and said trailing edge made at opposite side of said leading edge; and wherein the ratio of depth R of said recess and depth δ_s of said front step bearing and said side step bearing is $R / \delta_s > 5$, the depth δ_s of said front step bearing and said side step bearing is larger than 200nm, smaller than 400nm and the depth of said recess is larger than 1 μ m, 2.5 μ m or less.